

# Whatdunit?

Research scientists conduct studies to gather vital information biologists need to better manage Montana's wildlife. **By Tom Dickson**

Standing on a railroad track along the Big Hole River near Melrose, Vanna Boccadori scans the distant limestone bluffs, searching for a group of bighorn sheep that lives in these Pioneer Mountain foothills. For years, the Butte-based Montana Fish, Wildlife & Parks wildlife biologist has been unable to figure out why the lambs in this and four other local subherds keep dying.

"This was one of the biggest herds in Montana, with some of the world's largest rams," she says. "Now it's just a fraction of that."

Boccadori is here on this mid-June morning with Dr. Kelly Proffitt, FWP wildlife research scientist based in Bozeman. Proffitt is running a new FWP study—with financial support from the Wild Sheep Foundation and its Montana affiliate—aimed at learning what kills the lambs. The goal is to help Boccadori decide the best way to recover the struggling Highland herd, as the five subherds combined are known.

The study is typical of the roughly three dozen wildlife research projects FWP coordinates each year. Biologists need to know certain essential things about wildlife species, such as habitat requirements, migration routes, and predation rates. This allows them to make management decisions (often involving hunting season adjustments)

that help populations grow (or shrink in cases of overabundance).

"If we don't know what's causing a problem, we can't solve it. That's where the research component comes in," says Brian Wakeling, who previously worked for Arizona and Nevada state wildlife agencies and now oversees the FWP Game Management Bureau.

As essential as it is, most Montanans are unaware of how wildlife research works to benefit the state's elk, deer, grizzly bears, pronghorn, waterfowl, and other wildlife. I certainly didn't, and I've worked for the department for years. Which is why I'm out with Boccadori and Proffitt on this chilly

morning squinting up at the rocky cliff about a quarter-mile away.

The sharp-eyed biologists soon spot six ewes and six lambs. Proffitt says the females are extra skittish this time of year because the lambs, just a few weeks old, are especially vulnerable to mountain lions and golden eagles. Sensing three gawking humans, even at 400 yards, the family group begins running away.

Boccadori hands me her binoculars, and I watch the ewes scramble up the steep cliff, their lambs struggling to keep up. Suddenly one lamb slips and tumbles about 20 feet down the rock face, its landing obscured by a clump of wild mahogany. We stare up at the bluff and wait, fearing the worst.



**SEARCHING FOR CLUES** FWP wildlife research scientist Dr. Kelly Proffitt (left) and Butte-area wildlife biologist Vanna Boccadori monitor a struggling subherd of bighorn sheep in the foothills of the Pioneer Mountains.

## "Co-production"

If the job of police detectives is to figure out "whodunit," wildlife research biologists aim to learn "whatdunit." What's causing a mountain goat herd to die out? What's impeding mule deer migrations? What's causing waterfowl disease transmission? "Without our research crews, we'd really struggle to answer the many questions the public has about Montana's wildlife," says Neil Anderson, regional wildlife manager based in Kalispell.

In fact, obtaining scientific information is why, beginning in the late 1930s, Montanans insisted that what was then



**WHAT CAN BE DONE?** Wild sheep lambs in several herds across western Montana are dying before they can reach one year old. A new study of the Highland herd southwest of Butte may reveal the causes and help wildlife managers figure out the best way to stem population declines.

LEFT TO RIGHT: TOM DICKSON/MONTANA OUTDOORS; BRETT SWANN

called the Fish and Game Department hire trained research biologists in the first place. They wanted the agency to manage wildlife based on hard evidence, not hunches, guesswork, or the opinions of whoever shouts the loudest at public meetings. And that's still what Montanans want.

Information from studies, after being rigorously analyzed for flaws and inconsistencies (scientists loathe being called out by peers for sloppy work), is called "empirical" evidence. "But that doesn't mean it's set in stone," says Justin Gude, who oversees the FWP wildlife research unit. "All our results and analysis are subject to further testing to see if it holds up." Often it doesn't. But that's the beauty of the scientific method, Gude says. "Our findings are always open to review, scrutiny, and adjustment based on new learning."

According to Wakeling, Montana is recognized throughout the West for avoiding the "loading dock" approach to research. That's when agency scientists set out to learn things on their own, then return with management advice. Instead, "FWP takes the 'co-production' approach, where field biologists work hand-in-hand with research scientists every step of the way," he says.

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**FISHER FOOD** FWP Wildlife Research Bureau chief Justin Gude wires a deer haunch to a bait station deep in the Bitterroot Mountains. The goal is to attract fishers and then collect DNA samples that will help scientists learn where these elusive furbearers live so the habitats can be conserved.

### Shaping management

Hunters and others who value Montana's wildlife have long benefited from this information gathering and practical application. For instance, in the 1970s FWP and the University of Montana conducted an unprecedented study on the importance of dense vegetation in remote national forests

where elk can hide from hunters. Based on the findings, the U.S. Forest Service has protected thousands of acres of "security" cover over the past four decades to keep more elk in publicly accessible national forests during hunting season.

One of FWP's most publicized studies took place in the upper Bitterroot Valley. The aim was to figure out why the elk population had declined by 25 percent from 2005 to 2008 and calf survival was at historic lows. The region's growing wolf population seemed the most likely suspect. Yet the study found that, in fact, mountain lions were gobbling up far more elk. Researchers working with local wildlife biologists then adjusted the study to see if boosting lion harvest would help with calf survival. It did. By reducing the lion population by 30 percent with an increased hunter harvest quota,

FWP improved calf survival rates and helped the upper Bitterroot elk population rebound.

Marty Zaluski, Montana state veterinarian for the Department of Livestock, says FWP studies of elk movements have been essential for determining where livestock testing regulations are needed to protect the state's brucellosis-free status. "Identifying

cattle populations at risk of brucellosis from elk allows us to target regulations to make sure those cattle are tested before they enter interstate commerce," he says.

Another study's results showed that black bear hunting could reasonably continue in Montana. In the early 1990s, animal rights groups that had lobbied successfully to restrict bear harvest in Oregon and Colorado set their sights on Montana. They pointed out that FWP didn't know if hunters were killing more bears each year than the population could support. But after a nine-year study of black bear reproduction and mortality, FWP researchers found that only 3 percent of Montana's female black bears were being killed by hunters each year—well below the 10 to 15 percent maximum harvest rate that would threaten a sustainable population.

FWP scientists studying grizzly bears over the past two decades in the Northern Continental Divide Ecosystem, stretching from Glacier National Park south to the Blackfoot Valley, have documented that the population is healthy and growing. The evidence is Exhibit A as Montana petitions to remove grizzlies in that ecosystem from federal threatened species listing.

### Searching for "shedders"

Historical context often helps wildlife scientists better understand their subjects. In the new bighorn study in the Pioneer and Highland mountains, evidence of ancient sheep-drive stations built by Indigenous people shows that these semi-arid, high-altitude ranges were a historical bighorn stronghold for hundreds or thousands of years. But unregulated hunting and new diseases from Europe wiped out the population by the early 1900s. After the Montana Fish and

Game Department reintroduced wild sheep from the Rocky Mountain Front in the 1960s, the Highland population grew rapidly, to 300 to 400 bighorns by the early 1990s, many of them world-class rams. "It was one of the state's best sheep hunting and viewing areas," Boccadori says.

Then an outbreak of pneumonia in 1994-95 killed 80 to 90 percent of the herd. FWP has tried transplanting new bighorns from other parts of western Montana, but the population continues to falter. "I've watched this herd since 2005, and I've been seeing far too many lambs dying in their first year," Boccadori says.

But why? That's where Proffitt comes in. "We're trying to understand what's limiting population growth," the research scientist says. "It's possible these lambs are dying of pneumonia, but we need to learn if there are other causes of mortality."

In the winter of 2020-21, Proffitt, her team, and Boccadori captured almost all the ewes in the five sub-herds (52 total), determined which were pregnant, then fitted them with GPS collars that record and transmit six locations per day.

As soon as each ewe gave birth, researchers scrambled up rocky slopes to locate the newborn lamb and quickly fit it with a tiny GPS collar the size of a watchband (which pops off if the animal grows). Now Proffitt and Boccadori can see where the lambs go and, if they die, why. Proffitt says



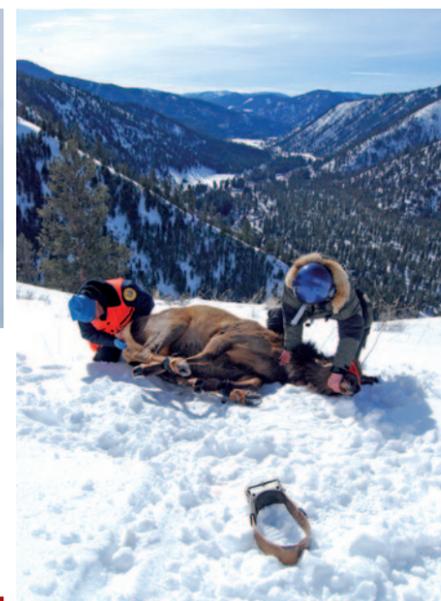
**EXHIBIT A** FWP bear research scientist Cecily Costello with a grizzly that she captured, tranquilized, and fitted with a GPS collar. FWP studies help bolster the argument that grizzlies could be removed from federal protection in parts of the state.

the young sheep may be mingling with "shedders," ewes in the herd that transmit pneumonia. "Or maybe they are being picked off by eagles or lions."

Boccadori hopes this research will provide FWP with new management options. "For instance, if we find out that pneumonia is the big issue, that tells us removing some shedders, if we can identify them, or even removing a subherd might work without



**CATCH AND RELEASE** To learn where elk and other wildlife travel and the habitats they use, wildlife researchers fit them with GPS collars that record locations (right). That's easier said than done. Capturing big game animals requires aerial crews to shoot capture nets from helicopters (left). Animals are then bagged and transported (above) to where biologists can take blood samples and fit them with collars.



CLOCKWISE FROM TOP: TONY BYNUM; MONTANA FWP; SHAWN T. STEWART; FWP; SHAWN T. STEWART; FWP

FROM TOP: MONTANA FWP; PAUL N. QUENEAU

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**TOUGH CHOICE** After shooting a Rock Creek bighorn sheep ewe that appeared sick with pneumonia, an FWP research crew takes blood and saliva samples. Killing infected sheep is sometimes necessary to prevent them from spreading disease to others in the herd.



**PARTNERS IN THE FIELD** Above: Butte-area wildlife biologist Vanna Boccadori (left) works with research scientists to take blood samples and other measurements from bighorn sheep. Right: An FWP wildlife biologist and a research scientist team up to ear tag an elk as part of a study into why upper Bitterroot herds were declining.



FROM TOP: ERIK PETERSEN/MONTANA FWP

having to take out the entire herd and start over with a blank slate,” she says. “But if we learn that it’s, say, predators, then removal wouldn’t do any good and we’d have to figure something else out.”

### Data gets used

Other studies have other uses. For instance, a current study is helping researchers and biologists better understand the size and population trend of Montana’s moose herds. “If a local population is trending down but we don’t know it, we risk issuing too many hunting licenses and setting moose recovery back for years,” says Ryan Rauscher, an FWP biologist responsible for managing moose along the Rocky Mountain Front.

According to Brett Dorak, FWP regional wildlife manager in Miles City, a current statewide pronghorn study is revealing where fences and other barriers block historical migration routes. “We’re taking those maps

to landowners and working with them to modify fences to allow for those seasonal movements,” he says.

FWP isn’t the only one putting its wildlife research information to work. The Montana Legislature and the Fish and Wildlife Commission regularly use the data for making laws and setting seasons. At their meeting this past August, commissioners frequently referenced the department’s innovative wolf monitoring method developed over the past decade as they decided on appropriate statewide and regional harvest quotas. Galatin County commissioners employ GPS maps of FWP elk movement to figure out how to manage mountain biking and other recreation in ways that don’t harm wildlife. FWP bear management specialists use GPS locations to alert ranchers and homeowners of possible grizzly and black bear activity, locate areas where people may be attracting

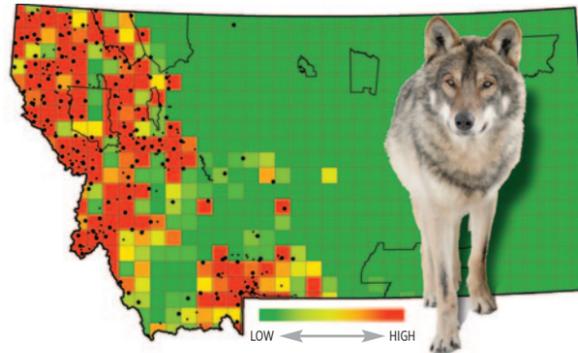
bears with unsecured food or garbage, or find bears that have been poached.

As of this fall, FWP has roughly 40 different studies under way, many in cooperation with the University of Montana and Montana State University. “We partner with professors, who have skills and expertise FWP might not have, and with their students, who are eager to do the work,” Gude says. “It’s a good deal for everyone.” For instance, an MSU graduate student is looking at which trees in northeastern Montana are used by northern long-eared bats, a federally protected species in danger of extinc-



## Hunters and others who value Montana’s wildlife have long benefited from this information gathering and practical application.

**IN GOOD HANDS** Above left: Current studies on what causes moose to die and which habitats they use will help FWP conserve the widely beloved species. Above: Research on harlequin ducks is helping nongame wildlife managers learn why populations may be declining.



**BIG BUY-IN** FWP’s innovative “patch” modeling approach to estimating wolf populations has been endorsed by department wildlife managers and the Fish and Wildlife Commission.

conducted by trained scientists, it builds confidence—that the commercial airliner you’re flying in won’t crash, the food you buy at the grocery store won’t sicken your family, the heart medicine your doctor prescribes won’t kill you, or the number of antlerless permits in a hunting district won’t over- or underharvest the elk population.

Federal agencies like the Bureau of Land Management (BLM) may use the survey information to identify which trees to leave standing in timber-thinning projects.

Gude says the lion’s share of wildlife research funding comes from hunters and other gun owners via the federal Pittman-Robertson excise tax on firearms and ammunition, which is reimbursed to each state. Funds for nongame wildlife research come from the federally funded State Wildlife Grant program. Universities, nonprofits like the Rocky Mountain Elk Foundation and the wild sheep organizations working with Boccadori, and federal agencies such as the BLM and U.S. Fish & Wildlife Service also chip in with funding, labor, or both. In many cases private landowners provide FWP with permission to capture and follow wildlife on their properties.

### Building confidence

Scientific knowledge is the foundation of decisions all people make every day. When

as well be throwing darts at a dartboard.”

Back at the Big Hole River, Boccadori, Proffitt, and I continue watching for the fallen lamb. Proffitt tells me it might be dead; despite taking careful precautions, researchers know there’s always a risk of causing stress or even death to a study animal. She looks up again through her binoculars and scans the bluff. After a few more minutes, she whispers, “Yes,” and points to the group, where we can now see all six lambs with their mothers.

That little one survived. But if later this year it and other lambs in the Highland herd die, Proffitt aims to figure out whatdunit. Then, as with other research projects, she’ll share the information with FWP biologists like Boccadori to help them more effectively manage bighorn sheep and other wildlife populations across the state. 🐾

“We have a responsibility to manage this state’s wildlife as effectively as we possibly can,” says Wakeling, the FWP Game Management Bureau chief. “That means using the best possible science. Without solid data, we might

Because FWP research helps biologists manage wildlife more effectively, everyone who values elk and other big game animals gains from study findings.



CLOCKWISE FROM TOP: LEFT: FWP; DONALD M. JONES; BRANDON KIESLING